LamaPLC: Eastron SDM 230 with Modbus Communication

The Eastron SDM230 Modbus MID 1-phase kWh meter is ideal for the precise monitoring of, for example, a solar panel system, a charging station, a heat pump, or another 1-phase group of your choice. On the illuminated LCD screen, you can immediately see how many kWh the respective system consumes or produces, and it is used for official registration and billing of the measurement data. For example, if you want to bill a tenant for the electricity consumption of a specific room.

Key Features

- **Measurement:** Measures various parameters, including active energy (kWh), reactive energy (kVArh), power (kW, kVAr, kVA), voltage, current, frequency, and power factor.
- **Bi-directional Energy:** Supports bi-directional energy measurement (import and export), making it suitable for solar PV and battery storage applications.
- **Direct Connection:** Designed for a maximum 100A direct connection, eliminating the need for external current transformers (CTs).
- **Display:** Features a blue-backlit LCD screen for easy reading of data.
- **Communication:** Includes two pulse outputs and a communication port (RS485 Modbus or M-Bus, depending on the model) for remote monitoring and integration with building management systems (BMS) or SCADA systems. Some models also offer Wi-Fi or LoRaWAN communication options.
- **Certification:** Many variants are MID-certified (Class B EN50470-3), making them suitable for billing applications.
- **Design:** Compact design (two modules wide, 36mm) for DIN rail mounting.

Technical Specifications

According to Eastron Europe and Camax.co.uk, the general specifications are as follows:

Specification	Detail
Nominal Voltage (Un)	230V AC (range 176~276V AC)
Base Current (Ib)	10A
Max. Current (Imax)	100A
Frequency	50/60 Hz (±10%)
Accuracy	Active Energy: Class 1 (IEC62053-21) / Class B (EN50470-3)
Power Consumption	<2W/10VA
Operating Temperature	-25°C to +55°C

Specification	Detail
Mounting	35mm DIN rail
IP Rating	IP51 (indoor)

Eastron SDM 230 Versions

The differences between versions of the Eastron SDM230 primarily involve physical wiring updates, communication defaults, and enhanced firmware features relating to energy measurement.

Feature	SDM230 V1	SDM230 V2 & V3
Physical Wiring Layout	Non-standard. Live In/Out at the top; Neutral In/Out at the bottom.	Standard. Live and Neutral In at the top; Live and Neutral Out at the bottom.
Energy Calculation	Basic energy measurement mode.	Enhanced “Net-counting” (better for solar/bidirectional energy).
Exported Energy	Limited export recording capability.	Separate and reliable measurement of exported energy (kWh).
Default Baud Rate	Often defaults to 2400 bps.	Often defaults to 9600 bps (configurable).
Resettable Energy	Single total energy counter.	Includes a second, user-resettable total energy counter.
Certifications	Older certifications	Updated MID certification options available
Firmware Date	Older builds	Recent builds (typically post-2018 for V2/V3)

2026/02/14 23:38

Modbus communication

RS485 communication interface, MODBUS RTU protocol:

- Baudrate: 9600 Baud (default, can be set)
- Parity: Even
- Databits: 8
- Stopbits: 1
- Default slave ID: 45
- Number of Drivers and Receivers: 32 Drivers, 32 Receivers (without repeater)
- Maximum Cable Length: 1200 m
- Maximum Data Rate: 10 Mbaud
- Maximum Common Mode Voltage: 12 V .. –7 V
- Minimum Driver Output Levels (Loaded): +/– 1.5 V
- Minimum Driver Output Levels (Unloaded): +/– 6 V
- Drive Load: Minimum 60 ohms

- Driver Output Short Circuit Current Limit: 150 mA to Gnd, 250 mA to 12 V, 250 mA to -7 V
- Minimum Receiver Input Resistance: 12 kΩ
- Receiver Sensitivity: +/- 200 mV

32-bit (2 words) input registers

The registers are read-only.
Float conversion: 32-bit float with big-endian

Code	Register Nr	Description	Type	Unit	Modbus reading
1st modbus block					
V1	30000	Line neutral volt	Float	V	Basis 0x00, words: 37
C1	30006	Current	Float	A	0x06
ACP1	30012	Active power	Float	W	0x0C
APP1	30018	Apparent power	Float	VA	0x12
RAP1	30024	Reactive power	Float	VAr	0x18
PF1	30030	Power factor	Float	-	0x1E
PA1	30036	Phase angle	Float	°	0x24
2nd modbus block					
FR1	30070	Frequency	Float	Hz	Basis 0x46, words: 25
IACE1	30072	Import active energy	Float	kWh	0x02
EACE1	30074	Export active energy	Float	kWh	0x04
IRAE1	30076	Import reactive energy	Float	kvarh	0x06
ERAE1	30078	Export reactive energy	Float	kvarh	0x08
TP	30084	Total system power demand	Float	W	0x0E
-	30086	Maximum total system power demand	Float	W	0x10
-	30088	Current system positive power demand	Float	W	0x12
-	30090	Maximum system positive power demand	Float	W	0x14
-	30092	Current system reverse power demand	Float	W	0x16
-	30094	Maximum system reverse power demand	Float	W	0x18
3th modbus block					
-	30258	Current demand	Float	A	Basis 0x102, words: 7
-	30264	Maximum current demand	Float	A	0x06
4th modbus block					
TAE	30342	Total active energy	Float	kWh	Basis 0x342, words: 7
TRE	30344	Total reactive energy	Float	kvarh	
-	30384	Current resettable total active energy	Float	kWh	
-	30386	Current resettable total reactive energy	Float	kvarh	
MA	40020	Modbus node address RW, default 45	Float	-	

Code	Register Nr	Description	Type	Unit	Modbus reading
MBR	40028	Modbus baud rate RW, 0 = 2400 bps□default□ 1 = 4800 bps 2 = 9600 bps 5=1200 bps	Float	-	

Arduino & Eastron SDM 230

To use the Eastron SDM230 with an Arduino, you need an RS-485-to-TTL converter module and a library such as the **SDM_Energy_Meter** library by reaper7, since the meter uses Modbus RTU over RS-485 physical lines.

Required Hardware

- **Arduino Board:** e.g., Uno, Nano, or ESP32.
- **RS485 Converter Module:** A module based on the MAX485 or similar chip.
- **Eastron SDM230:** Ensure its Modbus ID (address) and Baud Rate are noted (defaults are typically Address 1 and 2400 bps or 9600 bps; check your model's manual).

Wiring Schematic (MAX485 module)

MAX485 Pin	Function	Arduino Pin
VCC	Power	5V
GND	Ground	GND
DI	Driver Input (TX)	Pin 4 (SoftwareSerial TX)
RO	Receiver Output (RX)	Pin 3 (SoftwareSerial RX)
DE & RE	Driver/Receiver Enable	Pin 2 (Connect these two pins together)
A	RS485+	SDM230 Terminal A
B	RS485-	SDM230 Terminal B

Arduino Example Code

This example uses the **SDM_Energy_Meter library**. First, install the library via the Arduino Library Manager.

```
#include <SoftwareSerial.h>
#include <SDM.h>

// Pins for SoftwareSerial communication (RX, TX)
SoftwareSerial sdmSerial(3, 4);

// Pin used to control the DE/RE pins of the MAX485 converter
#define RS485_EN    2

// Create an SDM object (SoftwareSerial instance, Enable Pin, Slave ID)
// Default address is 1 (0x01)
SDM sdm(&sdmSerial, RS485_EN, 0x01);

void setup() {
  Serial.begin(115200);   // Serial monitor output to PC
```

```
  sdmSerial.begin(9600);  // SDM230 default baud rate (Check your meter, may be 2400bps)

  Serial.println("\nEastron SDM230 Reader Initialized");
}

void loop() {
  // Read Voltage (Register 0x0000)
  float voltage = sdm.readVal(SDM_PHASE_1_VOLTAGE);
  if (!isnan(voltage)) {
    Serial.print("Voltage: ");
    Serial.print(voltage);
    Serial.println(" V");
  } else {
    Serial.println("Failed to read Voltage");
  }

  // Read Total Power (Register 0x000C)
  float power = sdm.readVal(SDM_PHASE_1_POWER);
  if (!isnan(power)) {
    Serial.print("Power: ");
    Serial.print(power);
    Serial.println(" W");
  } else {
    Serial.println("Failed to read Power");
  }

  // Read Total Active Energy (Register 0x0156 or 0x0048 for Import)
  float energy = sdm.readVal(SDM_TOTAL_ACTIVE_ENERGY);
  if (!isnan(energy)) {
    Serial.print("Total Energy: ");
    Serial.print(energy);
    Serial.println(" kWh");
  } else {
    Serial.println("Failed to read Energy");
  }

  delay(3000); // Wait 3 seconds before next read
}
```

modbus, modbus rtu, eastron, modbus map, MID, SDM 230, SDM, Arduino, code